Facts about *Caulerpa taxifolia*

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The problem: The aquarium strain of *Caulerpa taxifolia* is an extremely invasive seaweed that is currently infesting tens of thousands of acres in the Mediterranean Sea and has now been found in two coastal water bodies in southern California.

Aquarium use: Due to its fast-growing, hardy nature and attractive appearance, *C. taxifolia* is used as a decorative saltwater aquarium plant. The variety of this species cultured for use in aquaria, known as the "aquarium strain," tolerates colder water and grows more rapidly than the native strain. The native strain is not known to be invasive, and is genetically distinct from the aquarium strain. It is now illegal to possess, sell, or transport *C. taxifolia* in California.

Description: *C. taxifolia* is bright green, with feathery, fern-like fronds that extend upward from a main stem.

Distribution: *C. taxifolia* is native to tropical waters, including the Caribbean, Indo-Pacific, and Red Sea. Infestations of the aquarium strain have been found in the Mediterranean Sea, Australia, and California.

Growth: The aquarium strain of *C. taxifolia* has the ability to form a dense carpet on any surface including rock, sand, and mud. It is capable of extremely rapid growth; up to one half inch per day (1 cm/day).

Depth: *C. taxifolia* can grow in shallow coastal lagoons as well as in deeper ocean waters, possibly to depths of greater than 150 feet (nearly 50 meters).

Ecological risks: Plant and animal diversity and abundance are reduced where *C. taxifolia* has invaded. The aquarium strain of *C. taxifolia* has been documented to displace native vegetation, particularly seagrass beds, and become the dominant plant life.

Human health threat: There are no human health risks associated with *Caulerpa taxifolia*.

Natural control: Outside of the tropics where *Caulerpa* occurs naturally, there is no known marine life that eats *C. taxifolia* in any significant quantities. *C. taxifolia* contains toxins that are distasteful to species that might feed on it.

Source and spread: Genetic evidence indicates that the most likely source of infestations in areas where *C. taxifolia* is not native is through release from aquaria. Once introduced, *C. taxifolia* spreads by fragmentation, and even a small, broken-off fragment can form a new plant. Distances between colonies can be great due to transport on boat anchors and fishing gear. *C. taxifolia* does not float, has never been observed to grow on boat hulls, and is unlikely to be transported in ballast water. Sexual reproduction has not been observed in the aquarium strain of *C. taxifolia*.

Mediterranean infestation: The aquarium strain of *C. taxifolia* was first found in the Mediterranean Sea off Monaco, adjacent to the Oceanographic Museum of Monaco, around 1984. Since then, *C. taxifolia* has spread along the Mediterranean coast and dramatically altered and displaced native plant and animal communities. Early eradication was not attempted in the Mediterranean, and the infestation is now

considered beyond control. As of 2001, it was estimated that *C. taxifolia* had infested over 30,000 acres of seafloor in Spain, France, Italy, Croatia and Tunisia. *C. taxifolia* infestations have negatively impacted tourism, commercial and recreational fishing, and recreational activities such as SCUBA diving.

Australian infestation: The invasive aquarium strain of *C. taxifolia* has been reported in South Australia and New South Wales and is invading in a pattern similar to the Mediterranean infestation. Efforts are being made to control its spread.

Southern California infestations: *C. taxifolia* was first identified in June 2000 in Agua Hedionda Lagoon, a coastal marine lagoon located in Carlsbad in San Diego County. Its growth pattern was similar to that observed in the Mediterranean Sea, having spread to many areas and displaced the native seagrass. In July 2000, another infestation of *C. taxifolia* was reported in a portion of Huntington Harbour in Orange County. Test results indicate that the *C. taxifolia* in both Huntington Harbour and Agua Hedionda is genetically identical to the aquarium strain. Releases from aquaria, either directly into the water body, or indirectly through a storm drain, are the most likely sources of both southern California infestations of *C. taxifolia*.

Legislation and regulations: Assembly Bill 1334 (Harman), signed into law by the Governor in September 2001, prohibits the possession, sale, and transport of *C. taxifolia* throughout California. This bill also establishes the same restrictions on several other species of the genus *Caulerpa* that are similar in appearance to *C. taxifolia* and that are believed to have the ability to become invasive. Earlier in 2001, the City of San Diego adopted an ordinance banning the possession, sale, and transport of the entire genus of *Caulerpa* within city limits. Furthermore, the importation, interstate sale (including Internet sale), and transport of the Mediterranean strain (i.e., aquarium strain) of *C. taxifolia* is prohibited under the federal Noxious Weed Act (1999) and the federal Plant Protection Act (2000).

Eradication effort: The Southern California *Caulerpa* Action Team, SCCAT, is a committee established to respond quickly and effectively to the discovery of *C. taxifolia* in southern California. The group consists of representatives from local, state, and federal governmental entities, as well as private organizations. The goal of SCCAT is to completely eradicate all *C. taxifolia* infestations and to prevent new infestations. As part of the eradication effort, divers periodically conduct surveys in Agua Hedionda and Huntington Harbour. Wherever *C. taxifolia* is found, it is contained and treated with chlorine. Long-term monitoring will be necessary to assure complete eradication.

Prevention of new infestations: Aquarium water and other contents should never be emptied into or near any gutter, storm drain, creek, lagoon, bay, harbor, or the ocean. Aquarium water should be disposed of only in a sink or toilet. Rock and other solid material from an aquarium should be disposed of in a trash can. *C. taxifolia* from an aquarium (and anything it is attached to), should be placed in a plastic bag, put in a freezer for at least 24 hours, and then disposed of in a trash can. If any seaweed suspected to be *C. taxifolia* is found on fishing gear, anchoring gear, or vessels, it should be removed, carefully bagged (since even a small fragment has the potential to regenerate into a new plant), and reported. In order to prevent new infestations and comply with the law, *Caulerpa taxifolia* should not be purchased, sold, or distributed.

Contact information: Any sightings of *Caulerpa taxifolia* should be immediately reported to the California Department of Fish and Game at (858) 467-4218 (wpaznokas@dfg.ca.gov) or National Marine Fisheries Service at (562) 980-4043 (bob.hoffman@noaa.gov). For further information, please visit www.caulerpa.cjb.net and www.sccat.net.